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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference M6644 HST	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/21117	International filing date (day/month/year) 13 SEPTEMBER 1999	Priority date (day/month/year) 11 SEPTEMBER 1998
International Patent Classification (IPC) or national classification and IPC IPC(7): C25D 11/36; C23C 28/00 and US Cl.: 205/199, 318		
Applicant HENKEL CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 18 FEBRUARY 2000	Date of completion of this report 04 OCTOBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer WILLIAM LEADER
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/21117

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed☒ the description:

pages 1-18, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of

☒ the claims:

pages 19-21, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of

☒ the drawings:

pages 1-1, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of

☒ the sequence listing part of the description:

pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages NONE☒ the claims, Nos. NONE☒ the drawings, sheets/fig. NONE5. ☒ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims <u>2-8, 10-18</u>	YES
	Claims <u>1, 9, 19-21</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-21</u>	NO
Industrial Applicability (IA)	Claims <u>1-21</u>	YES
	Claims <u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claims 1, 9, 19, 20 and 21 lack novelty under PCT Article 33(2) as being anticipated by Sonoda et al (US 4,874,480 A).

The Sonoda et al patent is directed to a process for forming a lubricative film for cold working on titanium and titanium alloy substrates. The substrates are immersed as the cathode in an electrolytic phosphate conversion coating bath which contains zinc cations and phosphate anions. An electric current is passed through the substrate to form a phosphate conversion coating. See the abstract. Thus, the Sonoda et al patent meets the limitations of claim 1, steps I(A), I(B), II and III. The bath contains zinc ions in a concentration of 1 to 50 g/l and phosphate ions in a concentration of 3 to 140 g/l. These ranges overlap the ranges recited in claim 2. The bath may also contain calcium, manganese or iron ions. These correspond to the metals recited in instant claims 3 and 9. Sonoda et al teach that the bath may additionally contain an oxidizing agent such as nitric acid. See column 2, lines 18-34. This teaching meets the limitation of claim 1, step I(C). The pH of the bath ranges from a highly acidic 1.0 to a moderately acidic 5.0 (column 2, lines 35-37). Coating is performed at a temperature ranging from 30° to 80° C (column 2, lines 39-41). Current density between 0.2 and 30 A/sq dm and electrolysis time between 10 seconds and 5 minutes may be used (column 2, lines 49-52). The coverage of the zinc phosphate film is between 2 and 20 g/sq m. Additionally, a lubricant is added on top of the phosphate film. This meets the limitation of claims 1, step (IV). Materials used as lubricants include known materials such as fatty acid sodium soap, oils and fats, mineral oils, solid lubricants, and the like (column 2, lines 56-62). These lubricants correspond to the lubricants recited in instant claims 7, 8, 13, 14, 17, 18, 20 and 21. In a preferred embodiment, the substrates are first treated with a colloidal titanium-based surface adjustment agent prior to immersion in the conversion coating bath. See column 2, lines 63-68. This treatment corresponds to the treatment of instant claims 6, 12, 16 and 19.

Claims 2-8 and 10-18 lack an inventive step under PCT Article 33(3) as being obvious over Sonoda et al in view of Witte (Continued on Supplemental Sheet.)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

5. (Some) amendments are considered to go beyond the disclosure as filed:
NONE

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):
(US 4,904,352 A).

The Sonoda et al patent is taken as above. Instant claim 2 recites that the conversion coating solution comprises at least 20 g/l of dissolved zinc cations and at least 20 g/l of dissolved phosphate anions. Instant claims 4 and 10 recite that the Ca:Zn ratio is from 0.1:1 to 2:1. Sonoda et al do not disclose these specific ranges. However, as noted above, Sonoda et al disclose zinc ions in a concentration of 1 to 50 g/l and a phosphate concentration of 3 to 140 g/l. These ranges significantly overlap the ranges concentration recited in instant claim 2. Additionally, the pH range recited in claim 2 would be expected to overlap the pH range of 1-5 disclosed by Sonoda et al. Based on the suggestion of Sonoda et al to include calcium ions, one of ordinary skill in the art would have been able to determine an appropriate amount as recited in claims 4 and 10.

In example 1 of Sonoda et al a cleaned sheet of titanium was treated with the conversion coating bath. The reference is silent as to how the sheet of titanium was cleaned.

The Witte patent is directed to a process for electrolytically coating a titanium article. Prior to coating, the titanium article is initially cleaned by conventional methods to remove oxides and surface contamination. The conventional cleaning methods that may be used include pickling and rinsing. See column 4, lines 31-41. This corresponds to the pickling and rinsing steps recited in instant claims 5, 11 and 15.

Claims 2-8 and 10-18 lack an inventive step since it would have been obvious at the time the invention was made to have cleaned the titanium substrates of Sonoda et al by pickling and rinsing because these are conventional cleaning steps which are known to be useful in preparing titanium substrates for coating as shown by Witte. Choice of appropriate values for the concentration of phosphate, zinc and calcium ions within the ranges recited would have been a matter of routine optimization within the skill of the ordinary worker in the art, particularly in view of the ranges disclosed by Sonoda et al.

Claims 1-21 meet the criteria set out in PCT Article 33(4) because the claimed invention has industrial applicability in the field of metal forming.

----- NEW CITATIONS -----

US 4,904,352 A (WITTE) 27 February 1990, see column 4, lines 28-41.

INTERNATIONAL SEARCH REPORT

 International application No.
 PCT/US99/21117
A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :C25D 11/36; C23C 28/00

US CL :205/199, 318

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 205/199, 318

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

 APS
 phosphate, lubricate
C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 4,874,480 A (SONODA et al) 17 October 1989, column 2, lines 18-34 and 56-62.	1, 3, 6-9, 12-14, 16-21 ----- 2, 4, 5, 10, 11, 15
Y	US 5,401,381 A (SEIDEL et al) 28 March 1995, column 6, line 63 to column 7, line 12.	1-21
Y	US 5,503,733 A (SPECKMANN et al) 02 April 1996, abstract.	1-21



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

19 DECEMBER 1999

Date of mailing of the international search report

01 FEB 2000

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